

Colorado Mheat Research Joundation

DECEMP, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR USING IT IN ADUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY ECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (I) SHALL BE SOLD BY VARIETY NAME ONLY AS A CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE STATE 1542, AS AMENDED, 7 U.S.C. 2321 ET SEO.)

WHEAT, COMMON

'Prowers 99'

In Testimony Marcrot, I have hereunto set my hand and caused the seal of the Hunt Unriety Frotestion Office to be affixed at the City of Washington, D.C. this twelfth day of September, in the year two thousand one.

Pal M. Sankrunl

Commissioner Plant Variety Protection Office Agricultural Marketing Service

REPRODUCE LOCALLY. Include form number and date on all reproductions.		FORM APPROVED - OMB NO. 0581-005
U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE	The following statements are made 1974 (5 U.S.C. 552a).	de in accordance with the Privacy Act of
APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE (Instructions and information collection burden statement on reverse)	Application is required in order to certificate is to be issued (7 U.S.C. until certificate is issued (7 U.S.C.	o determine if a plant variety protection C. 24211. Information is held confidential 2426).
1. NAME OF APPLICANTIST (as it is to appear on the Certificate) COLORADO WHEAT RESEARCH Foundation	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER (2098001-MB	PROWERS 99
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) DEP. OF SOIL ENG Crop Sciences.	5. TELEPHONE (Include area code) 970-491-6501	FOR OFFICIAL USE ONLY PVRO NUMBER
COLORADO STATE University FORT Collins, C080523	6. FAX finclude area codel 970-491-0564	Hogust 2,2000
7. GENUS AND SPECIES NAME Triticum aestiuum L Gramin 8. FAMILY NAME (Botenia) 9. CROP KIND NAME (Common name)		FILING AND EXAMINATION FIE. F. 1978 2450.00
Wheat, Common 10. If the APPLICANT NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership)	اس م	7-3-2400 GERTIFICATION FEE
11. IF INCORPORATED, GIVE STATE OF INCORPORATION	12. Date of incorporation	E DATE / /01
James S. Quick Lep. Soil & Crop Sciences CoLurado State University Fort Collins, Co 80523	NO NECELVE ALL PAPERS	14. TELEPHONE (Include area code) 970-491-6501 16. FAX (Include area code) 970-491-0564
16. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse) a. Distribit A. Origin and Breeding History of the Variety b. Distribit B. Statement of Distinctness c. Distribit C. Objective Description of the Variety	A STATE OF THE STA	
d. A Exhibit D. Additional Description of the Variety e. Exhibit E. Statement of the Basis of the Applicant's Ownership f. Voucher Sample (2,500 viable untreated seeds or, for tuber propagated varieties verification that tis g. Filing and Examination Fee (\$2,450), made payable to "Treasurer of the United States" (Mail to PVF)		d in a public repository)
17. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY, AS A YES If "yes," answer items 18 and 19 below!	CLASS OF CERTIFIED SEED? (See Section	83(a) of the Plant Variety Protection Actl?
GENERATIONS?	FOUNDATION REGISTERE	CERTIFIED
20. HAS THE VARIETY OR A HYBRID PRODUCED FROM THE VARIETY BEEN RELEASED, USED, OFFERED FOR YES OF YES, give names of countries and dates!	SALE, OR MARKETED IN THE U.S. OR O	THER COUNTRIES?
21. The applicant(s) declare that a viable sample of pasic seed of the variety will be furnished with application an applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and main. The undersigned applicant(s) is[are] the owner(s) of this sexually reproduced or tuber propagated plant variety. Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.	tained for the duration of the certificate.	en de la companya de
Applicant(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.	OF APPLICANT (Owner(s))	
Jan 1 Dainh		i i Mariana da Mariana Mariana da Mariana da M
James S. Quiek	se print or type	
Professor Jun 27,2000	ON TITLE	DATE
D-470 (04-96) (Previous editions are to be destroyed)	(See reverse for instructions and in	formation collection burden statement)

EXHIBIT A - BREEDING HISTORY

Geneology - Prowers 99 was derived from a modified bulk procedure following single plant selection (during 1997 and 1998) within the cultivar Prowers for improved resistance to the Russian wheat aphid (RWA), Diuraphis noxia Mordvilko. Prowers was derived from the crosses and backcrosses CO850060/PI 372129//5*Lamar. PI 372129 is the source of resistance to the Russian wheat aphid. CO850060 is a breeding line from the Colorado State University (CSU) breeding program, and Lamar is a cultivar released by CSU in 1988. Prowers was named and released to growers in September 1997.

In summer 1997, 200 single plant selections (head selections) were made at random within the cultivar Prowers and planted as headrows in fall 1997 for production of breeder seed in 1998. Seed subsamples from each of these selections was subjected to two cycles (during fall and winter 1997-98) of standard greenhouse screening procedures. The first cycle identified 86 plant selections with resistance to the RWA. Progeny testing of these plant selections confirmed RWA resistance in 67 plant selections. In summer 1998, seed of these 67 RWA-resistant plant selections was bulked to form CO980001-MB for planting of the foundation seed increase in fall 1998. No other evaluation of CO980001-MB has been undertaken.

Under an isolated reproduction system, the cultivar Prowers 99 has no known variants. Prowers 99 has been observed in field tests for two years and is stable to the best of our knowledge with respect to genetic change caused by mutations or heterozygosity.

Under an isolated reproduction system in the absence of the Russian wheat aphid, the cultivar Prowers 99 has no known variants. See Exhibit D for variability under artificial infestation conditions. Prowers 99 has been observed for three generations in field tests for three years and is uniform and stable to the best of our knowledge.

EXHIBIT B - STATEMENT OF DISTINCTNESS

Prowers 99 is most similar to and most closely resembles Prowers, an awned, white-chaffed, medium tall, medium late hard red winter wheat. It is similar to Prowers in all respects except that it has improved resistance to the Russian wheat aphid. Table 1 in Exhibit D provides clear evidence of this resistance as tested in May 1999. Additionally, Prowers 99 and Prowers have been tested in greenhouse tests in February 2000 and 2001, and the improved resistance confirmed. The gene for resistance in Dn4 in both Prowers 99 and Prowers. Qualitative RWA resistance is determined in greenhouse tests (see Crop Sci. 31:905-7). It cannot be distinguished from Prowers except for its reaction to the RWA.

EFFECDUCE LOCALLY. Include form number and date on all reproductions.

Form Appears - OMB No. 651-065

Control of this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the search of this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Agriculture, Clearance Officer, ORM, AG Box 7630, Jamia L. Whitten Building, Washington; D.C. 20250. When replying, refer to OMB No. 0581-0055 and form number in your letter. Under the PRA of 1935, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

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> U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE SCIENCE AND TECHNOLOGY PLANT VARIETY PROTECTION OFFICE BELTSVILLE, MD 20705

EXHIBIT C (Wheat)

OBJECTIVE DESCRIPTION OF VARIETY WHEAT (Triticum spp.)

KAME OF APPLICANT(S)	QAN a lallon	T Dr==10111	The state of	FOR OFFICIAL USE ONLY
<u> </u>	MADO WHEA.	RESEARCH 1	-OUNDATION	PVPO NUMBER
ADDRESS (Street and No. or RD N			_	200000315
COLORI	ADO STATE Y	CROP SCIEN	CES	PROWERS 99
	- COLLINS, COS			TEMPORARY OR EXPERIMENTAL DESIGNATION C098001 - MB
a minimum of 100 plants. (may be used to determine pl	(e.g. 10 19 19 or 10 19 1) with Comparative data should be determined ant colors; designate system use	en number is either 99 or less (crinined from varieties entered	or 9 or less respectively. D in the same trial. Royal H	haracter of this variety in the boxes below. lata for quantitative plant characters should be based of orticultural Society or any recognized color standard
1. KIND:				
	1=Common	2=Durum	3=Club	4=Other (SPECIFY):
2. VERNALIZATIO	N-	-		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
		•		•
2	1=Spring	2=Winter	3=Other (SP)	ECIFY):
3. COLEOPTILE AN	THOCYANIN:		<u> </u>	
	1=Absent	2=Present	•	ر المعلق الم المعلق المعلق المعل
. JUVENILE PLAN	T GROWTH:	<i>y</i>		· · · · · · · · · · · · · · · · · · ·
2	1=Prostrate	2=Semi-erect	3=Erect	
5. PLANT COLOR (boot stage):			
2	1 = Yellow-Green	2 = Green	3 = Blue-Gree	n .
. FLAG LEAF (book	t stage):		· ·	
	1 = Erect	2 = Recurved	/	1 = Not Twisted 2 = Twisted
. EAR EMERGENC	E:			
		00	~ A-	
00	Number of Days Earl	ier Than <u>PROW</u>	EE7	*

<u> </u>
s):
ē RS
T66
Relative to a PVPO-Approved Commercial Variety Grown in the Same 7
and Saint
D. INTERNODE (SPECIFY NUMBER)
1= Hollow 2=Semi-solid 3=Solid
E. PEDUNCLE
2 1=Absent 2=Present
2 cm Length
C. CURVATURE
1 = Erect 2 = Inclined 3 = Recurved
D. AWNEDNESS
1 = Awnless 2 = Apically Awnletted 3 = Awnletted 4 = Awned
C. BEAK
$\boxed{3} 1 = \text{Obtuse} \qquad 2 = \text{Acute}$
3 = Acute 3 = Acuminate
D. LENGTH
2 1 = Short 2 = Medium (ca. 7mm) (ca. 8mm) 3 = Long (ca. 9mm)
······ B (> mm)

12.	GLUMI	ES (at Maturity) C	Continued:				20000	0315
	E. V	WIDTH						•
	. 2	1 = Narrow (c 3 = Wide (ca.		Medium (ca. 3.5m	m)		••	
13.	SEED:							
٠	A. S	БНАРЕ		•	C. BI	RUSH		
-	1	1 = Ovate	2 = Oval	3 = Elliptical		1=Short	2=Medium	3=Long
ANY JUN	go ^l			_		1 = Not Collared	2 = Collared	
Q, C	В. С	НЕЕК		•	D. CI	UEASE		
		1=Rounded	2=Angular		3	1 = Width 60% or less 2 = Width 80% or less 3 = Width Nearly as W	of Kernel	# ·
	·. ·					1 = Depth 20% or less 2 = Depth 35% or less 3 = Depth 50% or less	of Kernel	
	E. Co	olor			G. PH	ENOL REACTION (se	e instructions):	•
: :	3	1=White 4=OTHER (S _l	2= Amber pecify)	3= Red	4	1 = Ivory 3 = Light Brown 5 = Black	2 = Fawn 4 = Dark Brown	1 1
	F. T	EXTURE	i .					
		1=Hard	2=Soft	·				
4. l	DISEASE	: (0=Not Tes	sted; 1=Susce	ptible; 2=Resis	tant; 3	=Intermediate; 4=To	lerant)	
		. 1	PLEASE INDIC	ATE THE SPEC	FIC RAC	E OR STRAIN TESTE	D	
	2	Stem Rust (Put Field Mixt	ccinia graminis f	. sp. <i>tritici)</i>	3	Leaf Rust (Puccinia re		
	0	Stripe Rust (Pa	uc cinia s triiformi	s)	0	Loose Smut (Ustilago t	•	
	0	Tan Spot (Pyre	mophora tritici-re	epentis)	0	Flag Smut (Urocystis a	gropyri)	
•	Ø	Halo Spot <i>(Sel</i>	enophoma donac	is)		Common Bunt (Tilletic	ı tritici or T. laevis)	
	0	Septoria nodoru	m (Glume Bloto	h)		Dwarf Bunt (Tilletia co	ontroversa)	
	0	Septoria avenae	(Speckled Leaf	Disease)	0	Karnal Bunt (Tilletia i		
	٥	Septoria tritici (Speckled Leaf B	lotch)	0	Powdery Mildew (Erys	<i>iphe graminis</i> f. sp.	. tritici)
	0	Scab (Fusariun	r spp.)		0	"Snow Molds"		

60 777								
14.	• Disea	se (Continued)	(0=Not Tested;	1=Susceptible;	2=Resistant;	3=Inter	mediate; 4=To	olerant)
•			PLEASE IN	DICATE THE SP	ECIFIC RAC	E OR STRA	UN TESTED	0.00315
•	0	"Black Point"	(Kernel Smudge)	[3	Commo Bipolari		(Fusarium, Coci	aliobolus and
÷		Barley Yellow ! Field Mixtu	Dwarf Virus (BYDV 서신) [Rhizoct	onia Root R	ot <i>(Rhizoctonia</i> .	solani)
. •	0	Soilborne Mosa	ic Virus (SBMV)		Black C	haff <i>(Xanth</i>	omonas campest	ris pv. translucens)
	0	Wheat Yellow (Spindle Streak) Mos	aic Virus	Bacteria syringae		t (Pseudomonas	syringae pv.
		Wheat Streak N Field Mixi	Iosaic Virus (WSM)	n [Other (SPECIFY)		
		Other (SPECIF	Y)		Other (S	SPECIFY)		and a state of
		Other (SPECIF	Y)		Other (S	SPECIFY)		
		Other (SPECIF	Y)		Other (S	SPECIFY)		÷
15. IN	SECT:	(0=Not Teste	d; 1=Susceptible;	2=Resistant;	3=Intermed	iate; 4=T	Colerant)	
-			PLEASE S	PECIFY BIOTY	PE (where nee	ded)		
	0	Hessian Fly (Ma	yetiola destructor)		Other (S	PECIFY)		
·	0	Stem Sawfly (Ce	phus spp.)		Other (S	PECIFY)	•	
	0	Cereal Leaf Beet	le (Oulema melanopo	2)	Other (S	PECIFY)		
** • •	2	Russian Aphid (Diuraphis noxia 1999		Other (S	PECIFY)		
	0	Greenbug (Schiz			Other (Si	PECIFY)		***
	0	Aphids			Other (S)	PECIFY)	g galagini i gaganinin dhe	

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS

EXHIBIT D - ADDITIONAL DESCRIPTION

The cultivar Prowers 99 has been released because of its improved resistance to the Russian wheat aphid, <u>Diuraphis noxia</u>, Mordvilko. Qualitative RWA resistance is determined in greenhouse tests (see Crop Sci. 31:905-7). Data in Table 1 indicate its improved resistance level. The Russian wheat aphid has caused significant grain yield and quality losses in Colorado.

Table 1. Number and percentage of symptomatic plants at two weeks (rating 1) and three weeks (rating 2) of five Russian wheat aphid (RWA) resistant sources and one check following artificial greenhouse infestation.

		Rating 1 (5/14/99)		Rating 2 (5	5/23/99)	•	
Entry	#Plants [†]	Number	%	Number	%		
Halt	91	3	3.3	6	6.6		
Prowers 99	111	9	8.1	14	12.6		
Yumar	98	4	4.1	26	26.5		
Prairie Red	94	14	12.4	37	32.7		
Prowers	120	52	43.3	64	53.3		
Carson (check)	12			_	dead		

[†]Planting Date: 4/21/99.

Based on composite samples from several Colorado locations in 1999, the flour protein concentration of Prowers 99 (12.6 g kg⁻¹) has been similar to Prowers (12.1 g kg⁻¹). They have strong mixing characteristics as determined by the mixograph (4.0 min to peak). In Colorado milling and baking tests, Prowers 99 has been similar in overall quality to Prowers, a high quality standard

U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE	The following statements are made in accordance with the Privacy Act 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.			
EXHIBIT E STATEMENT OF THE BASIS OF OWNERSHIP	Application is required in order to de certificate is to be issued (7 U.S.C. 2- until certificate is issued (7 U.S.C. 2426	421). Information is held confidential		
1. NAME OF APPLICANT(S) COLORADO WHEAT RESEARCH FOUNDATION	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER CO 980001- M B	PROWERS 99		
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country) DEPT OF SOLL AND (ROP SCIENCES COLORADO STATE UNIVERSITY	5. TELEPHONE (include area code) 970 - 491 - 650 1 7. PVPO NUMBER	6. FAX (include area code) 970-491-0564		
FORT COLLINS, CO 80523	00003157			
8. Does the applicant own all rights to the variety? Mark an "X" in appropri	nate block. If no, please explain.	YES NO		
9. Is the applicant (individual or company) a U.S. national or U.S. based of If no, give name of country	ompany?	YES - NO		
10. Is the applicant the original owner? YES	(O) If no, please answer one of the fo	ollowing:		
a. If original rights to variety were owned by individual(s), is (are) the or	riginal owner(s) a U.S. national(s)?	•		
b. If original rights to variety were owned by a company(ies), is(are) the	(O If no, give name of country eriginal owner(s) a U.S. based company	<i>i</i> ?		
₩ YES	If no, give name of country			
11. Additional explanation on ownership (if needed, use reverse for extra s	pace):			

The cultivar for which Plant Variety Protection is hereby sought, was developed by a CSU team led by Dr. James S. Quick, an employee of Colorado State University (CSU). By agreement between Dr. Quick and CSU, all rights to all cultivars developed by him while employed by CSU were assigned to CSU. Ownership of the cultivar has been transferred from CSU to the Colorado Wheat Research Foundation, Inc., 7700 East Arapahoe Road, Suite 220, Englewood, CO 80112.

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria:

- 1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
- 2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
- 3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definition.

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